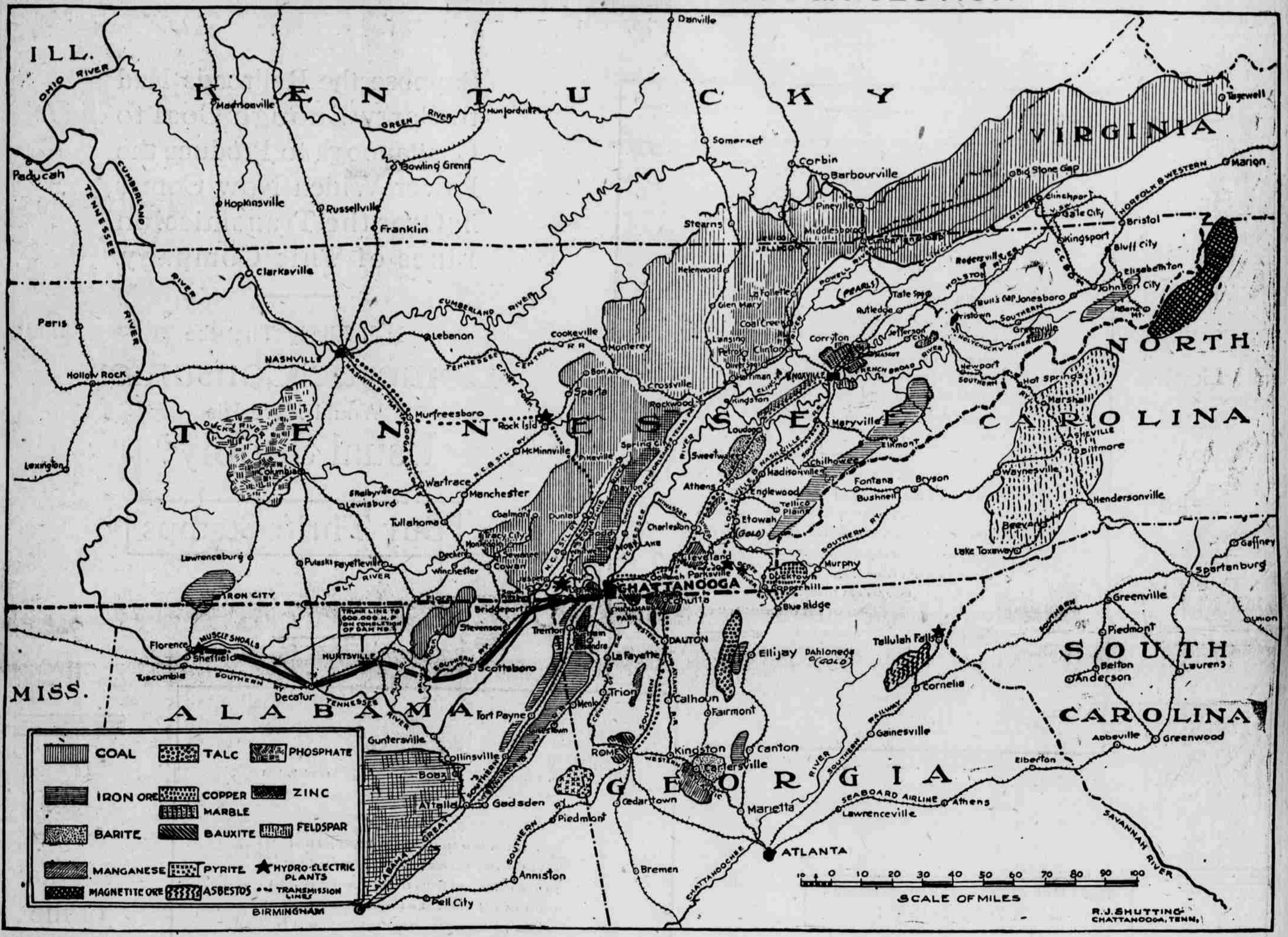
SECTION TWO

MANUFACTURING Commerce Finance

Being a Measure of the Energy Generated By the "Dynamo of Dixie"

The Chattanooga News — **August Thirty-first, 1918**

MINERAL MAP OF CHATTANOOGA SECTION



Showing how natural routes of assemblage from large deposits of coal, iron, barite, bauxite, manganese, etc., center at Chattanooga, where also converge the power lines from the big hydroelectric plants in the Appalachian mountains.

CHATTANOOGA IN THE MIDST OF REMARKABLE MINERAL DEPOSITS

Presentation of Factors Which Have Produced Great Iron Industry in Chattanooga and List of Minerals Assuming New Importance in Light of Latest Metallurgical Developments and War Needs.

Chattanooga offers to manufacturers an unsurpassed location with reference not only to transportation, but raw materials as well. In the matter of transportation, the location of the city upon the Tennessee river has given it a very appreciable advantage in freight rates, and the river, along which are many valuable mineral deposits, offers a tempting opportunity for the cheap transportation of bulky raw materials, such as ores.

When it comes to minerals, as a member of the recently visiting American Electrochemical society said, "You have a veritable gem of a city here." He was speaking in metaphor of the city's location in the exact center of one of the most remarkable mineral fields in the world, a location that permits of the most advantageous assemblage of all the raw materials entering into a number of fundamental products.

Not only do the main routes of mineral assemblage center in Chattanooga, but the city is so situated that it can draw with equal facility upon a number of most important hydroelectric developments, thus bringing together the material and the power necessary to work the materials into finished products. One hundred and fifty thousand horsepower are developed by the installation at Hale's bar, Ocoee, and Parksville, and upon the completion of the huge dam at Muscle Shoals Chattanooga will have a trunk line to 600,000 more horsepower.

Pre-eminently An Iron Center.

Of course the greatest opportunity presented in Chattanooga has been for the working of iron. It was as an iron city that Chattanooga first gained commercial fame, and the other great lines of manufacture which have since sprung up came after the development of the basic industry. Of course, at the present time, the list of local industry includes not only iron, but spreads to cover lines of the widest variety and importance.

To understand the prominence of Chattanooga in the iron working field it is but necessary to glance at the disposition in the surrounding hills and mountains of the basic elements entering its production.

entering its production, as outlined in the recent Armon Plant and Nitrate briefs.

City Rimmed With Coal Fields.

Twenty miles in a direct course west of Chattanooga is the Cumberland Plateau with 250 square miles of a coal field that contains over two billion tons of coal altogether, and five hundred billion tons of coking coal, yielding in by-products ovens nearly 78 per cent. coke as against 72 per cent. for Pittsburgh coal. The southern part of this field is but eight miles from the Tennessee river north of Hale's bar, where there is slack water to Chattanooga, a distance of twenty-five miles. The high character of the coal is shown by the analysis:

Volatile matter	27.30
Fixed Carbon	63.60
Ash	8.10
Sulphur	0.85

Analysis taken from "The By-Product Cooking Industry of America," page 50.

This coal makes a strictly high grade coke containing 87 per cent. carbon and the yield from one ton of coal in the Koppers by-product oven is as follows:

Coke, per cent.	77.80
Tar, gallons	8
Sulphate of Am., pounds	22
Gas, cubic feet	10,300
Surplus gas, cubic feet	5,300

Same authority as above.

For comparison, Pittsburgh coal will yield:

Coke, per cent.	72.52
Tar, gallons	10
Sulphate of Am., pounds	25
Gas, cubic feet	11,000
Surplus gas, cubic feet	6,000

Same authority as above.

Walden's Ridge, north of the city, and paralleled for a long distance by the C., N. O. & T. P. railway, giving a direct route of delivery into the city, is estimated to contain nearly two billion tons of recoverable coal. Some of the most famous mines in this field are those at Soddy and the mines of the Dayton Coal and Iron company at Dayton, Tenn.

These figures show about four billion tons of recoverable coal without considering the tonnage in Lookout Mountain and Sand Mountain. From the coal in the former mountain is produced the famous Durham coke, which is used all over the country as one of the best foundry cokes obtainable.

There are four railroads bringing coal into Chattanooga at the present time, the number of which minimize the danger of congestion in coal delivery. Last winter, when the coal shortage was at its worst, over one or the other of these roads coal was rolling into Chattanooga, and at no time was there really a coal famine in the city.

Iron Ore Surrounds City

As with coal, so with iron. The ores in the Chattanooga district in reserve are estimated to be in excess of the reserves in the Birmingham district, and consist of three varieties, brown, Clinton red hematite, and magnetite.

Brown Ore.

It would be difficult to estimate the quantity of brown ore within an eighty-five mile radius of Chattanooga, because the occurrence of the ore is "pockety" and uncertain as to continuity, unless prospected thoroughly. It, however, is found in workable quantities over a large area, wherever the "Fort Payne" chert is found, and these deposits are residual. To the east, in the metamorphic and crystalline rocks, are found, "fissure deposits" with some degree of continuity. An estimate of 30,000,000 tons of brown ore is an approximation.

The average analysis as shipped is: iron 47 per cent., insoluble 17 per cent., manganese 1 per cent.-2. per cent., phosphorus .2 per cent-.per per cent. 9.

Clinton Ore.

The Clinton red hematite ore is here in great abundance; as is well known this ore is found as a regularly stratified member of the Rockwood formation of the Upper Silurian geological period. It is mined from the Canadian border nearly to the Gulf; it is the ore in the Briey Basin, near Verdun, France; in Belgium and Luxembourg, and is the sole source of iron ore supply for the furnaces in Poland, now operated by the Germans with coke brought from Germany.

Within a radius of seventy-five miles of Chattanooga, north, south and west, and underlying the coal measures, with only the Bangor Limestone and a thin stratum of the Devonian geological period in between, are great sheets of this Clinton ore.

There are three beds of this ore, with ore always of workable thickness and character. Under Lookout Mountain and its spurs, and at the gates of the city, there are calculated to be 2,594,000,000 tons of recoverable ore. Of this amount, there are some 150,000,000 tons analyzing 38 per cent. to 40 per cent. iron; 25 per cent to 30 per cent. carbonate of lime; 8 per cent. to 12 per cent. silica and alumina; 0.06 per cent to 1.6 per cent manganese; 0.2 per cent. to 0.56 per cent. phosphorus; a trace to 0.1 per cent sulphur. The remaining tonnage will average 33 per cent. iron.

To the east of Lookout Mountain is Taylor Ridge, which has some 20,000,000 tons of soft iron ore on transportation that contains 50 per cent. iron, 22 per cent. isoluble, and from 0.3 per per cent. to 0.6 phosphorus.

The soft ore in Taylor Ridge is mined and taken to Gadsden, Ala., and Middlesboro, Ky., and LaFollette, Tenn. The soft ore from Lookout Mountain as well as the hard ore, is taken to LaFollette, Tenn., and Chattanooga, and was when the Bristol, Tennessee-Virginia furnace was in operation, taken there. The freight to Middlesboro and LaFollette to 90 cents; to Bristol $1.00; to Chattanooga 30 cents.

From the Tennessee river at Chattanooga, north for seventy miles, outcroppings on both sides of Waldens Ridge, is a sheet of Clinton ore 36 inches thick, containing, it is estimated, 1,900,000,000 tons of recoverable ore. This ore, at the south end of the ridge, on the west side in Sequatchie Valley, has 27.93 per cent. iron; 7.07 per cent. insoluble; 18.11 quick lime.

At the north end, at Rockwood, where it has been profitably mined for fifty years, it averages 42 inches thick; iron 38 per cent.; silica and alumina 13.46 per cent.; manganese 15 per cent.-92 per cent. phosphorus 0.416 per cent. to 0.736 per cent. sulphur 0.02 per cent. to 0.2 per cent.

The magnetite ore of this section is mainly located in Upper East Tennessee where Chattanooga interests some time ago obtained valuable options.

While minerals connected with the iron industry may be termed the foundation upon which the prosperity of the section has been based, those minerals lack a great deal of being the sum total of the riches in the earth around Chattanooga. The other minerals assume a new importance just at this time, when so many of the rarer metals have been shut off from importation and when the war is making demands of the liveliest kind for all sorts of materials hitherto rather neglected.

Take manganese for instance. Everybody understands the extreme necessity for plentiful manganese deposits in view of the demand for manganese steel, and around this section are extensive and valuable deposits. The principal source of manganese for this section is Cartersville, Ga., south of the city, and the next source is East Tennessee and Northeast Georgia, near the Tennessee line.

Cartersville Manganese Ore.

The Cartersville area is fifteen miles by five miles, and contains a great deal of ore yet to be mined, and is on the waters of the Etowah river. The East Tennesse ore lies in a zone which traverses the entire eastern end of the state. New deposits of this ore are continually being discovered and some of it of a very high grade.

Plenty of Good Bauxite.

Bauxite, the ore of aluminus, is a mineral which has come into increasing demand both for the arts of war and for the ends of peace, and Chattanooga lies in a section where there is much of this ore. Some of it is shipped to the electrolitic plant for conversion into aluminum, but much of it is used by a local chemical concern in the manufacture of alum. Bauxite exists here in association with the Fort Payne chert and the Knox Dolomite. It is mined in Mission Ridge just east of Chattanooga, and is found in the continuation of the ridge, both north and south, and is usually found in chimney formation known as pockets. Tennessee and Alabama produce 10 per cent. of the bauxite produced in the United States.

Limestone For Cement Making.

Of course in the mountains around Chattanooga limestone is about the commonest thing encountered. There is also much good shale, and in a number of places these two are encountered in proportions and analyses suitable for cement manufacture. At Richard City, Tenn., some twenty-odd miles across country from Chattanooga is located the largest cement mill, that of the Dixie Portland Cement company, in the south, and one of the very largest in the whole country. This mill has a daily output of between 4,000 and 5,000 barrels per day, and obtains its raw material from a huge mountain of limestone and shale just back of the plant.

Other Minerals In This Section.

Barytes, or barite, is found almost exclusively in the south. It has been mined in Virginia for more than 100 years and is about exhausted there. The largest deposits are in East Tennessee south and north of Sweetwater and near Cartersville, Ga.

East Tennessee and Georgia produced about 60,000 tons in 1917.

In East Tennessee on the Carolina border are located two large copper companies which produce copper from pyrite and recover,as a by-product, the sulphur fumes from which is made sulphuric acid. Great quantities are produced there. There are many and large deposits of brown hematite iron ore in the metamorphic rocks of east Tennessee and Georgia that at water level and below are pyrite, for nearly all if not all these deposits are of sulphide origin. Some of the deposits are as wide as 90 feet, and will yield immense quantities of pyrite. There are other deposits not altered to brown iron ore.

Other unusual minerals found in this district are: graphite, of which a large industry has been founded in the last two years; felspars, both soda and potash; fullers earth; silica in abundance; talee and clays of every kind and variety except clay to make high grade fire brick.

A Message.

(Reprinted from The Lookout.)

From the workmen at U. S. N. P. No. 2, Muscle Shoals, Ala., to their fellow soldiers in France and Flanders with Gen. Pershing, May 25, 1918.

You hold 'em, buddy boy! We're with you heart and hand
In this yere scrap to save the world and freedom in our land.
We know just what you're up against, 'way out there in France,
But hold 'em, hold 'em, buddy boy, till you git your final chance.
We've all chipped in our bit of cash this glorious Red Cross day
To help you git what's yours by right if you're hurt while you're away.
We're hustlin' here both day and night, an' Sundays, too, you bet,
To git this plant a-goin'—an' we'll do it, don't you fret!
The hammer's rattlin' on the steel as the rivets are headed tight
Is our machine-gun volley in defense of human right.
Each nail we drive, each concrete mix an' all
The rest of what we do is our answer to the call.
We're comin' strong, you buddy boy, we're comin' right as well;
We're fixin' here to send you stuff to give the Germans hell!
It won't be long now, buddy boy, till you will hear from us;
We're workin' quiet-like an' calm, with mighty little fuss.
But hold 'em, buddy, hold 'em, till our work here is done,
An' you'll git a chance to do right smart agin the beastly Hun.
For what this plant will send across to the Flanders battle line
Is what you need to finish up the dirty German swine.
"Ammonium Nitrate" is it's name—an' it's all of that and some—
An' it's exactly what you need to put the kaiser on the bum.
So hold' em, buddy boy! We're with you heart an' hand
In this yere scrap to save the world and freedom in our land!

—Capt. Stephen L. Coles, Ordnance Reserve Corps, Inspector of Construction, U. S. N. P. No. 2.